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LOWER CARBONIFEROUS PALAEONISCOIDS (PISCES : ACTINOPTERYGII) FROM QUEENSLAND

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ABSTRACT

Incomplete remains of Lower Carboniferous palaeoniscoid fishes from the Star of Hope Formation, northern Queensland, are described and figured, but due to absence of diagnostic features must be assigned to the suborder Palaeoniscoidei, family indeterminate. Lower Carboniferous palaeoniscoid remains from the Narrien Range, central Queensland, are figured for the first time; such microfossils could provide biostratigraphic information. Queensland records of Carboniferous palaeoniscoid fishes are discussed and compared with those from the Mansfield fauna of Victoria.

INTRODUCTION

Robert Etheridge jnr (in Jack and Etheridge 1892, pp. 136, 296) mentioned a headless palaeoniscoid fish from the Star of Hope Formation which he regarded as a possible new species of the genus *Palaeoniscus*, and named it after the collector W.H. Rands. There is some uncertainty regarding the identification of GSQ L1522 as being the same specimen to which Etheridge referred, as he did not refer to a specimen number. We are confident that the specimen seen by Etheridge and by A.S. Woodward was actually GSQ L1522, in the absence of other articulated remains of palaeoniscoids from the same district. Turner (1982, p. 601) and Long and Turner (1984, p. 242) both refer to the name given by Etheridge to his material as *nomen nudum*, and therefore we refrain from useage of this name in this work to avoid future confusion. In this paper we describe two specimens of palaeoniscoid fishes from the Star of Hope Formation and attempt to summarize the status of other Carboniferous palaeoniscoids from other parts of Australia.

SYSTEMATIC DESCRIPTION

Family ACTINOPTERYGII
Order PALAEONISCIFORMES
Suborder PALAEONISCOIDEI

Palaeoniscoid Family and Genus indet. A.
(Pl. 1A, Fig. 1)

MATERIAL EXAMINED

Specimen GSQ L1522 from the Suttor River, 4 miles WSW of Mt McConnell, near Lornesleigh Station, Charters Towers district, north Queensland, Lower Carboniferous, Star of Hope Formation ('Star Beds'); impression of part of body only from behind to pectoral region to the posterior of the trunk including most of the caudal fin, excluding the extremities of the dorsal and ventral hypochordal lobes. Squamation intact in places.

DESCRIPTION

The specimen (Pl. 1A, Fig. 1) is a small palaeoniscoid fish having a slender caudal peduncle. There are approximately 15-16 scale rows from the anterior extent of the ventral hypochordal lobe of the caudal fin to the posterior extent of the dorsal fin. There are about 13 scales in the posterior most scale rows and up to 18 at the level of the dorsal fin. On average typical rhomboid body scales are 1.5 mm long by 1.0 mm wide. Nine dorsal fulcral scales are visible from the caudal inversion scale row to the dorsal fin, although we infer that eleven would have been present because of the spacing posterior to the dorsal fin rays. The dorsl fulcral scales are ovoid in shape becoming more triangular posteriorly, merging evenly with the elongate caudal fulcral ridge scales. The first, inferred, dorsal fulcral scale abuts two rows, as do the fifth, sixth and eight dorsal fulcral scales. The ninth dorsal fulcral scale at the position of the caudal inversion abuts two to three scale rows. There are disrupted ventral fulcral scales seen between the caudal fin and the tenth scale row (from posterior), indicating that the ventral midline of the caudal peduncle bore fulcral scales which were presumably slightly longer than the dorsal fulcral scales. The dorsal fulcral scales have a faint ornament of posteriorly directed ridges whereas the fulcral scales on the

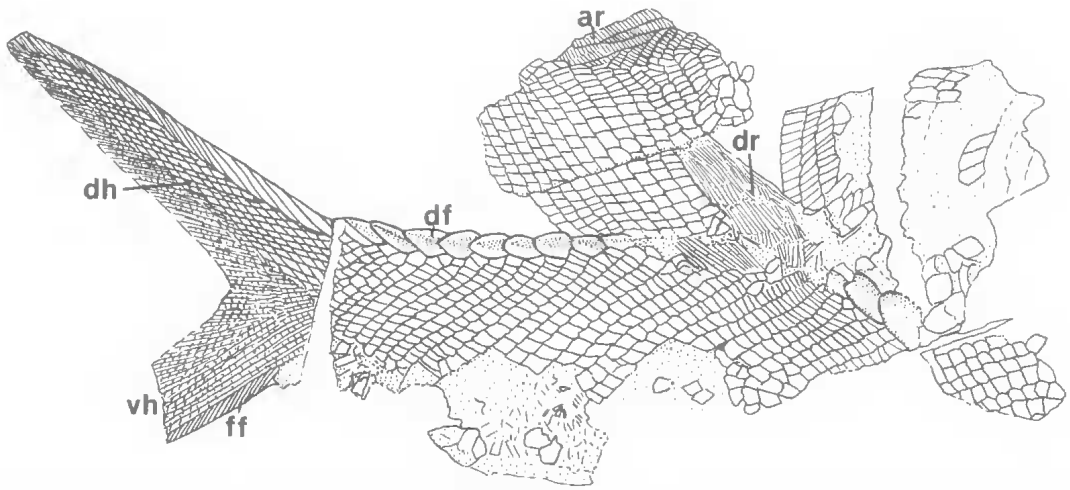


FIG. 1: Sketch — Palaeoniscoid gen. et sp. indet A. GSQ L1522. Abbreviations: ar — anal fin rays; df — dorsal fulcral scales; dh — dorsal hypochordal lobe; dr — dorsal fin rays; ff — fringing fulcral scale; vh — ventral hypochordal lobe. Scale bar — 10 mm.

dorsal hypochordal lobe are smooth. The caudal fin is apparently deeply cleft and has a closely-packed series of fringing fulcra along the leading edge of the ventral hypochordal lobe. Lepidotrichiae are segmented and bifurcating.

DISCUSSION

From the above description, with the lack of detailed scale ornament and because the head region is absent, it is clear that the original specimen cannot be accurately placed within the Palaeoniscoidei. The discovery of further specimens with good cranial material particularly would help to define the position of this palaeoniscoid more accurately if we could relate such specimens to the original.

Palaeoniscoid Family and Genus indet. B.
(Pl. IB–C, Fig. 2)

DESCRIPTION

A second articulated specimen, CPC 25610, came from close to the first locality, 2 miles NNW of Mt McConnell Homestead. This specimen is a patch of squamation clearly exhibiting the scale ornament (figured as F22921 in White 1968). About 16 oblique scale rows are preserved. On average the rhombic body scales are 2.5 mm long by 2.0 mm wide. At least four large basal fulcral or ridge scales can be seen towards the corner of one side. The ornament on these body fulcral scales consists of a series of curved ridges following the curved rhombic outlines of the scale; the ridges anatomose anteriorly and some have small bulbous swellings along their length. In the rounded ridge scales there is a slightly raised anterior zone leading into the middle ridge; the six-seven main lateral ridges on either side curve around this central area and end posteriorly in a series of up to 14 digitations (Fig. 2). The rhombic body scales are ornamented with about 10 ridges which also have swellings along their length in some cases.

DISCUSSION

This second specimen might belong to the same taxon as Palaeoniscoid Family and Genus indet. A because of the similar development of scale shape and body (i.e. dorsal and ventral as opposed to caudal) fulcral scale ornamentation and because it comes from a similar stratigraphic horizon. More material will be needed to assess further the status of these specimens.

REMARKS

The genus *Palaeoniscum s.s.*, which is known from the Upper Permian to Lower Trias, was reviewed extensively by Aldinger (1937, p. 95), who gave a new diagnosis (see also Gardiner 1963). The generalized features of the caudal region of the genus *Palaeoniscum*, such as a narrow caudal peduncle, deeply cleft tail and fringing fulchra, can be seen on GSQ L1522, although many Permo-Carboniferous palaeoniscoids have dorsal and

FIG. 2: Palaeoniscoid gen. et sp. indet. B. CPC 25610, sketch to show squamation pattern and ornamentation in fulcral region; scale bar approx. = 1mm. Posterior to top.

ventral fulcral scales and fringing fulcra along the leading edges of the fins (Lehmann 1966). Scale morphology has been little studied to date, and is as yet unreliable for identification of palaeoniscoids because of the superficial similarities between the scales of the same region of the body exhibited by most genera (see for example, figures in Traquair 1888–1914). However, comparison with recent studies, those on teleost scales by Grande (1982), for instance, provides hope that a future analysis of scale characters in palaeoniscoids could provide useful phylogenetic and biostratigraphic information. For now, palaeoniscoids can only be reliably identified from cranial material. Kazantseva-Selezneva (1981) lists over 47 families of palaeoniscoids, all of which require details of the cranium for identification.

OTHER AUSTRALIAN RECORDS OF *PALAEONISCUM*

Long and Turner (1984) summarized the records of *Palaeoniscum* from Australia as follows:
1. *P. antipodeus* Egerton 1864: L. Trias, NSW; Aldinger (1937), genus uncertain.
2. *P. feistmanteli* Woodward 1891: L. Trias, NSW: Aldinger (1937), genus uncertain.
3. *P. crassus* (Woodward 1908): L. Trias Aldinger (1937), genus uncertain.

Long and Turner (1984) assigned all provisionally to the Family Palaeoniscidae.

Conclusion: the occurrence of the genus *Palaeoniscum* in Australia is not proven.

THE MANSFIELD FAUNA

The only other well-known Carboniferous fish fauna in Australia is that studied by Woodward in 1906. He described the Lower Carboniferous fish fauna from the Mansfield Basin, Victoria which included two new palaeoniscoid species, which he named *Elonichthys sweeti* and *Elonichthys gibbus*. These represent the only other Carboniferous palaeoniscoids described from articulated material in Australia.

In a review of that material Long (1984) prepared the specimens and revealed that two new genera were present in the fauna. The genus *Elonichthys*, as defined by Gardiner (1963), is not present in the material. The Mansfield palaeoniscoids are now known to comprise one new genus of gonatodid and a new genus of palaeoniscoid belonging to its own monotypic family. This latter form is somewhat similar to GSQ L1522 but differs in having fewer scale rows from the dorsal fin to the caudal scale row inversion.

SUMMARY OF RECORDS OF CARBONIFEROUS PALAEONISCOIDS IN QUEENSLAND

Other palaeoniscoid remains have been found in Queensland throughout the Carboniferous; most are represented by scales alone and, as yet, none has been described in detail. J.T. Woods, then Senior Palaeontologist at the Geological Survey of Queensland, made preliminary attempts at identification of the Survey palaeoniscoid specimens (e.g. Woods 1964). Most of those scales mentioned in the literature have been referred to the genera '*Palaeoniscus*' and '*Elonichthys*' (see Turner 1982). We have stressed above the genus *Palaeoniscus* is not present in Australia. As the identification of the other genus is based on remains which are mostly patches of scales, and

because the Mansfield forms have been discounted, the presence of *Elonichthys* in Australia is also dubious. Many of the scales are similar to those shown in Plates 1 and 2 and some probably belong to elonichthyids.

Scales in the Sybil Group, Marshs Creek Beds of north Queensland, however, are not the typical peg and socket-bearing rhomboid scales; these are cycloid scales which Woods thought comparable with those of *Cryphiolepis*, for the Survey specimens are so designated. These scales are similar to ones recently described from the Early Permian of Western Australia by Archbold (1981), which Turner (in press) has referred to the Family Cryphiolepidae.

The following examples bearing palaeoniscoid scales have been found in the collections of the Queensland Museum (QM), the Geological Survey of Queensland (GSQ), the Bureau of Mineral Resources, Canberra (CPC, BMR) and the University of Queensland Geology Department (UQ), and during field work by the senior author (RF).

Lower Carboniferous

Drummond Basin

For geology see Olgers 1972, and Day *et al.* 1983.

Telemon Formation (Tournaisian)

1. QM L52, L56 and L71, bone bed and dark grey limestone from the centre of the Narrien Range, south of Anne Peak, west of Clermont (Bartholomai in de Bretizel 1966, Turner 1982) — examples shown in Plate 2.
2. GSQ 170, 173 and 174, limestones collected 'west of Clermont' by K. Gough 1961.

Raymond Formation

1. QM RF 1-3, bone bed in algal limestone about 100 m from base of formation, eastern flank of the Narrien Range, west of Clermont.
2. QM M99, bone bed in blue limestone about 233 m above base of formation, north of Anne Peak and Star of Hope Bore Road (Bartholomai in de Bretizel 1966, Turner 1982).

Ducabrook Formation

1. QM (archival letters from Mr Sexton, 1883); GSQ 1523, 1524, L292, L553 (Jack and Etheridge 1892); UQ F1932-34, UQ F9948, UQ F17347-51, Bogantungan-Hannam's Gap railway cutting, including Medway Creek near Railway Bridge, or creeks within 2 km.
2. UQ F29778-93, limestone M561, Withersfield Railway Station (Shell 1952).
3. UQ F24403-4, UQ F58309, algal (M318) and oolitic (M349) limestones, Callistemon-Echo Hills section (Shell 1952).
4. UQ F24400, limestone M778, Anakie uplift section c-c1 (Shell 1952).
5. UQ F58311, sandy oolitic limestone M800a, Cattle Creek.
6. UQ M238 silty limestone with *Leaia*, west flank Nogoa anticline.
7. GSQ F8617 Ducabrook Homestead, SE of Emerald (pl. C XIV, figs. 14-15, Hill and Woods 1964).

North Queensland

Star of Hope Formation

1. GSQ L1522, Suttor River, WSW of Mt McConnell, Lornesleigh Station.
2. CPC F22921, NNW Mt McConnel Station.
3. BMR localities 280 — limestone with palaeoniscoid scales, and 126/2 — siltstone with bone and scales.

Upper Carboniferous

North Queensland Burdekin-Star Basin

Sybil Group, Marshs Creek Beds (see Day *et al.* 1983, figure 6).

1. GSQ L293, L398, limestones near New Moon Station.

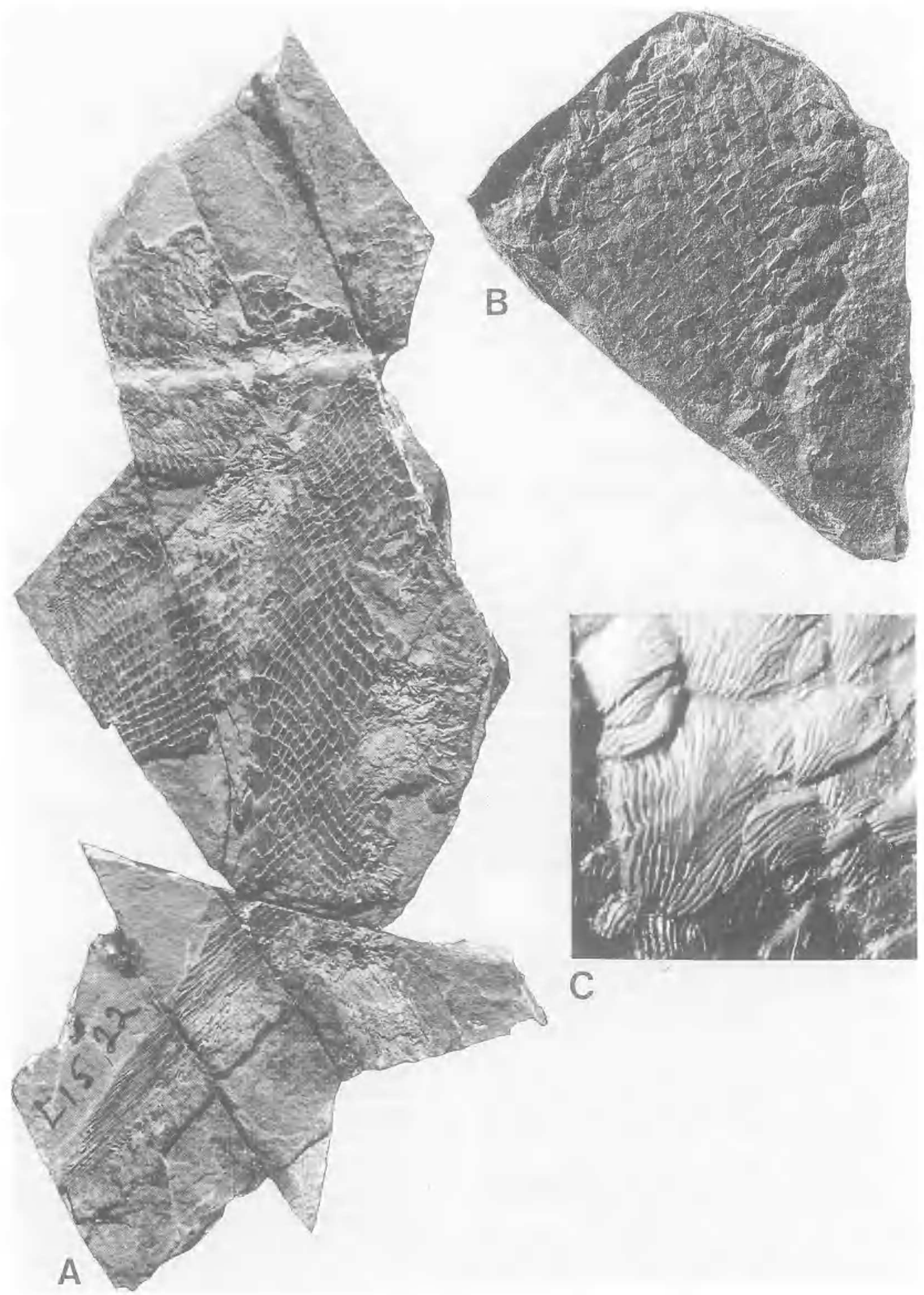
Southeast Queensland

1. GSQ Vince Palmieri coll. no.1 33, Lower Pennsylvanian Barambah limestone, 'Wondai Series'?, SE of Murgon (Palmieri 1969).

CONCLUSIONS

Carboniferous palaeoniscoid material in Australia (except for the Mansfield fauna, Long, in press) is not well-defined below the familial

PLATE 1: Articulated palaeoniscoid specimens from the Lower Carboniferous of Queensland. A. GSQ L1522, Palaeoniscoid gen. et sp. indet. A from Suttor River, near Mt McConnell, × 1. B. CPC 25610 Palaeoniscoid gen. et sp. indet. B. Cast of palaeoniscoid scales from Mt McConnell Station, × 1. C. Close up of cast of basal fulcral scales of CPC 25610 to show scale ornament, × 4.


B
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A

level. The specimen from north Queensland referred to '*Palaeoniscus*' by Etheridge jnr is an indeterminate palaeoniscoid.

Work has begun on the Carboniferous vertebrate microfauna from several localities in Queensland. It is hoped that specific differences between scales, especially fulcral scales, tooth plates, and teeth, for instance, will allow some biostratigraphic use of the palaeoniscoids to be made in the future. Plate 2 shows some examples of Lower Carboniferous palaeoniscoid microremains from the Telemon Formation of the Narrien Range. On the basis of scale and dermal bone ornamentation of this material at least three types of palaeoniscoid appear to be present in the Lower Carboniferous of Queensland. Braincase material preserved in the Narrien samples indicates that the palaeoniscoids appear to be primitive.

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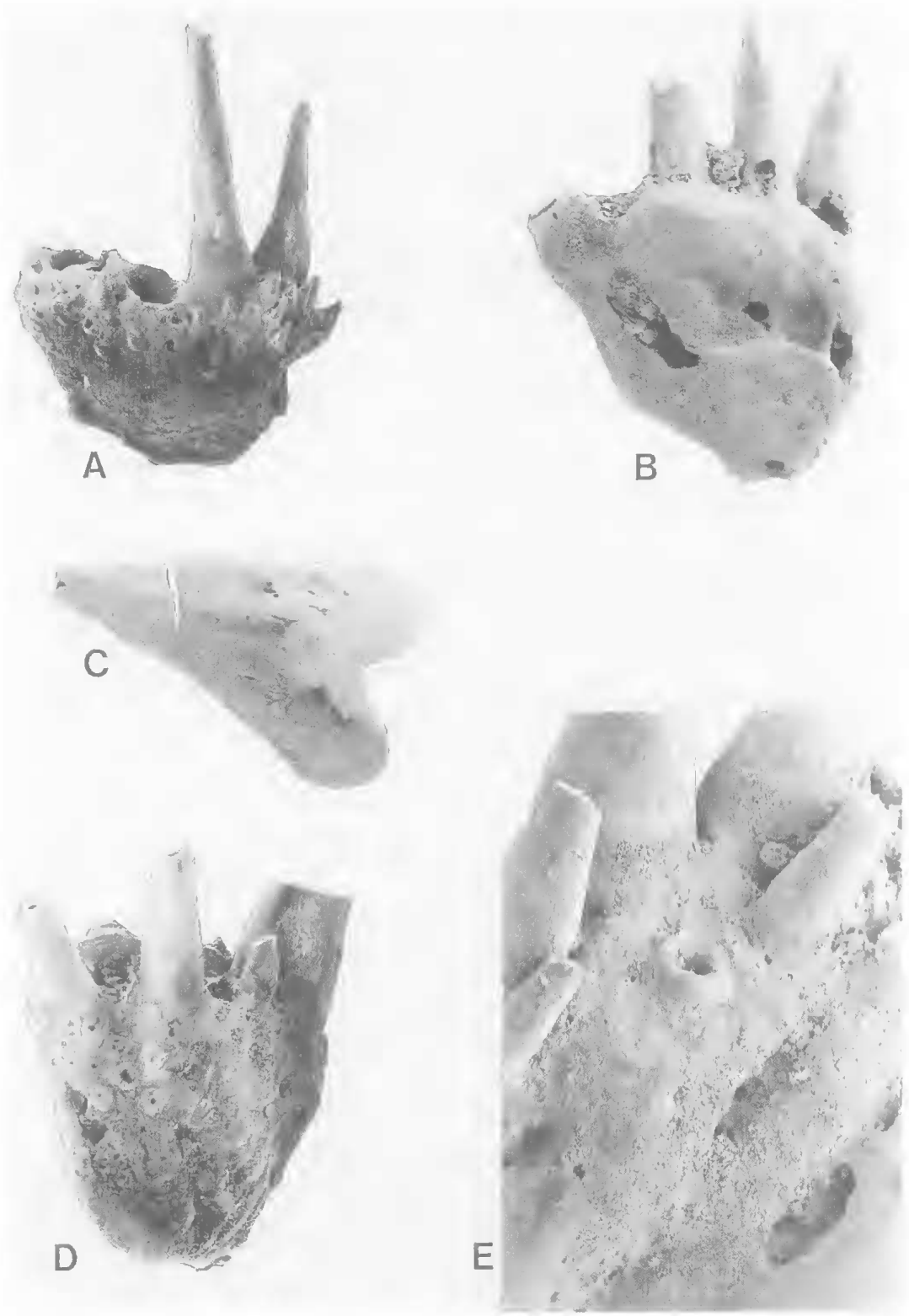
PLATE 2: Palaeoniscoid microremains from locality L52, Telemon Formation, Narrien Range, central Queensland. **A**. QM F13402. Labial view of toothplate of palaeoniscoid gen. et sp. indet. C, approx. × 60. **B**. QM F13403. Lingual view of toothplate of palaeoniscoid gen. et sp. indet. D, approx. × 35. **C**. QM F13404. Dorsal view of ventral (?) fulcral scale of palaeoniscoid gen. et sp. indet., approx. × 38. **D**. QM F13405. Labial view of toothplate of palaeonisoid gen. et sp. indet. E, approx. × 60. **E**. QM F13403. Close up of teeth in labial view to show fine structure and tooth attachment, approx. × 100.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